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How CSR affects to the cost of new corporate bonds

Evidence from the S&P 500 firms

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ABSTRACT:

Despite the massive growth of Corporate Social Responsibility (CSR) matters in last decade, there exists no evidence how CSR activities are valued nowadays in the U.S. corporate bond market. This thesis fills the gap by examining the impacts of CSR to the cost of new corporate bonds in the U.S. Four CSR test variables based on ESG scores derived from Thomson Reuters Asset4 -database are used to measure the level of firms' CSR. After checking availability of all variables, the final sample consists of 417 bonds issued by non-financial S&P 500 companies during 2003–2018. The effect is tested by using pooled OLS regressions with relevant bond- and firm-specific variables.

The empirical results of this study show that all four CSR variables have negative and statistically significant impact to yield spreads during the whole sample period, supporting the risk mitigation theory of CSR. When examining the effect of top and bottom 25% quantiles of CSR variables to yield spreads, High CSR variables report negative and Low CSR variables report positive coefficients. Findings are significant for High CSR and High Social variables and for Low Environmental variable. These results confirm the risk mitigation theory and indicate that lenders reward firms with better CSR activities with lower costs of corporate bonds, whereas weak CSR companies are punished with higher costs of corporate bonds.

In order to search the association between CSR and yield spreads during different market circumstances and over time, the sample period is divided to pre-crisis period (2003–2006), crisis period (2007–2009) and post-crisis period (2010–2018). Pre-crisis period report positive but insignificant coefficients in all models. During the crisis time, Governance pillar significantly decreases the yield spread in two models and Environmental pillar in one model. However, the sample size sets a limitation to these pre-crisis and crisis period findings as they include only 30 and 32 bond observations. Post-crisis period results display that all CSR variables have negative and statistically significant impact to yield spreads. The effect is stronger than in the case of whole sample period, which is consistent with the recent increment of sustainability related trends.

The results of this study prove that lenders regard CSR activities from the risk mitigation perspective and reward firms with better CSR, whereas there are no signs about overinvestment consideration in the corporate bond market of the U.S. This encourages companies to invest towards CSR actions as this way they can achieve lower funding costs.

KEYWORDS: Corporate Social Responsibility, ESG, cost of corporate bonds, yield spreads

Contents

Figures

Tables

Appendices

Abbreviations

BPS	Basis points
CSP	Corporate Social Performance
CSR	Corporate Social Responsibility
ESG	Environmental, Social and Governance
SDG	Sustainable Development Goals

SIFMA	Securities Industry and Financial Markets Association
SRI	Sustainable, responsible and impact investing
S&P 500	Standard and Poor’s 500 -index
UNGG	United Nations Global Compact
WBCSD	World Business Council for Sustainable Development
YTM	Yield to Maturity

1 Introduction

The relevance of Corporate Social Responsibility (CSR) has accelerated rapidly in business environment and society during the past years. Nowadays firms do not only face the pressure to meet their financial objectives but also act sustainably and socially responsible way by considering for instance climate change, social relations and transparent governance in their business. As a result, companies have started to paid attention to corporate social responsibility matters and allocated assets towards CSR actions in order to meet the expectations of various stakeholders. (Magnanelli & Izzo 2017; Menz 2010; Hoepner, Oikonomou, Scholtens & Schröder 2016.)

However, the main incentive for companies behind the CSR actions is that they might lead to financial benefits (Magnanelli & Izzo 2017). From the capital market perspective, the potential financial benefits of CSR activities are mainly related to the risk mitigation aspect of CSR and therefore lower funding costs. The previous studies have primarily focused to study the relationship between CSR and cost of equity, whereas the effects of CSR in corporate debt market has received less attention. The results from the capital markets are mixed as the risk mitigation theory is supported by e.g. El Ghoul, Guedhami, Kwok and Mishra (2011), who find negative association between CSR and cost of equity. In turn, Goss and Roberts (2011) discover that better CSR does not decrease the cost of bank loans, but few prior papers from corporate bond market have detected that firms with better CSR achieve lower cost of corporate bond than firms with weaker CSR in the U.S. market (Oikonomou, Brooks & Pavelin 2014; Ge & Liu 2015).

Nonetheless, these studies from corporate bond market are limited to year 2009 and there exists huge lack of evidence about how CSR is valued in the corporate bond market nowadays, when individuals and companies are more aware about responsibility and sustainability matters than ever. At the same time, the magnitude of new corporate bond issuances of U.S. firms has grown over 50% from 2010 to 2018. Moreover, during the research sample period from 2003 to 2018, the worth of equity issuances was 4.2 trillion, whereas the worth of corporate bond issuances was 19 trillion in the U.S. (SIFMA 2019).

Because the bond market is many times larger than the equity market, it is important to extend the research in corporate bond market to find out if firms' CSR performance has any impact to cost of new corporate bonds. As this thesis process the new bonds issued by firms listed in S&P 500, the results will not only produce practical implications directly for these firms themselves, but also indirectly to vast amount of equity investors worldwide as funding costs are strongly related to companies' financial performance .

1.1 Purpose of the thesis

The purpose of this thesis is to investigate the relationship between CSR performance and cost of new corporate bonds issued by non-financial S&P 500 companies. The motivation behind the study is to find evidence about how CSR is priced in the corporate bond market and therefore provide information for companies and investors. The findings will imply whether companies can achieve lower funding cost by investing to CSR actions or will lenders penalize them because of inefficient resource use. Moreover, the study process whether the CSR is regarded variously in the bond market during the different market circumstances.

1.2 Research hypotheses

This thesis aims to explore how the level of CSR affects to the cost of new corporate bonds in the U.S. market. The previous academic studies discover the negative association between CSR and cost of bonds (e.g. Oikonomou et al. 2014; Ge & Liu 2015). This is mainly explained by risk mitigation theory, which states that higher levels of CSR will lower the firm's risk and thus lead to decline in the cost of corporate debt. Correspondingly, lower levels of CSR are assumed to increase the cost of debt (Goss & Roberts 2011). The first hypothesis is based on these risk reducing features of CSR actions:

H1: The level of overall CSR and individual aspects of ESG are negatively associated with cost of new corporate bonds.

However, the negative linear relationship does not necessarily hold in the case of extremely high levels of CSR. Bae, Chang and Yi (2018B) discover that cost of bank loans is starting to raise again after the level of CSR is moving from the optimal level towards extreme high levels. That is explained to be due of banks' ability to collect and process the information more efficiently than others. Banks are considering supremely high CSR inputs as an overinvestment and therefore punish these firms (Goss and Roberts 2011). However, the information availability is more limited in the corporate bond market and therefore, the negative linear relationship is assumed to hold also between the top and bottom 25% quantiles of CSR and cost of new corporate bonds:

H2: Firms with the top (bottom) 25% levels of overall CSR and individual aspects of ESG will obtain lower (higher) cost of new corporate bonds.

The association between CSR and cost of debt might vary according to business cycles as CSR activities are possibly regarded variously during different market circumstances (Bae et al. 2018b). La Rosa, Liberatore, Mazzi and Terzani (2018) observe that lenders mainly focus to financial information and ignore CSR-related information during the crisis time. Moreover, Hsu and Chen (2015) discover higher cost of corporate bonds for better CSR firms than for weak CSR firm in the 1995 and 2009, which might indicate various results during the crisis time. However, due to lack of comprehensive crisis period evidence from corporate bond market, third hypothesis assumes that the association between CSR metrics and cost of debt remains stable during different market conditions:

H3: The level of overall CSR and individual aspects of ESG are negatively associated with cost of new corporate bonds during the pre-, current and post-crisis periods.

1.3 Contribution

Although the U.S. markets are usually widely studied, there exist huge lack of evidence about how CSR affects to the cost of corporate bonds nowadays. The several U.S. market papers study the topic (Oikonomou et al. 2014; Ge & Liu 2015), but there are some key differences compared to this thesis. First, these studies have used the different data sources and they measure the level of CSR and ESG factors in a different way, focusing mainly to the effect of individual CSR measures e.g. community strengths and concerns. In this thesis, overall ESG, environmental, social and governance scores are straightly derived from the Thomson Reuters Asset4 -database in order to generate extensive and reliable picture about these factors.

Second, the previous surveys are limited to year 2009 and there exists no more recent evidence, though the importance of CSR has accelerated rapidly in the business environment during the last decade. This paper contributes the previous literature by providing new evidence of how CSR is valued in the bond market nowadays, by dividing the sample to different sub-sample periods.

Third, the market situations have changed considerably in the 2000s, but due to limited time frame, the effects of different market circumstances are excluded in previous studies. Therefore, this thesis contributes the academic literature also by searching the impacts before, during and after the global financial crisis. The findings will show whether CSR inputs are valued similarly during the different macroeconomic cycles.

1.4 Structure of the thesis

This thesis is structured as follows: Second chapter presents theoretical background of the CSR and debt markets. It defines the CSR concept and represents the history and relevant theories of it. The end of the chapter focuses to corporate debt markets and

presents specific features of corporate bonds and how they are priced. Previous studies focusing to CSR and cost of debt are reviewed and analyzed in chapter three. Sample data, research methodology and regression variables are described in chapter four and empirical findings of this thesis are reported and interpreted in chapter five. Finally, last chapter summarizes the empirical findings of this study and concludes the thesis with suggestions for further research.

2 Theoretical background

This chapter explains the meaning of CSR and how it has developed from early times to these days. In addition, recent sustainability and responsibility themes and programs are introduced to enlighten current propagation of CSR-related trends. The CSR theories are provided in order to explain the potential linkage between CSR and cost of debt from different perspectives.

2.1 Definition of CSR

Corporate Social Responsibility has achieved remarkable attention and importance in business nowadays, but there exists no unambiguous definition about what CSR really is and what it incorporates. Due to lack of exact definition and wide range of CSR-related perspectives, the same terminology is used with different intentions and different terminology is used in order to explain same intentions. Votaw (1972) gives examples about how various ways CSR can be considered: to some it means legal responsibility or liability; other view it as behaving ethically right; one assumes it is equal to charity actions of firms; some thinks it is related to social awareness. Although this definition issue is aged, the situation is not improved over time. (Garriga & Mele 2004; Votaw 1972.)

One common definition of CSR is presented at the World Business Council for Sustainable Development (WBCSD) report in 2000:

‘‘Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large.’’ (Holme & Watts 2000).

This definition is widely referred by academics in the CSR field as it gives intelligible and holistic picture about the CSR (Beurden & Gössling 2008). Another well-known definition of CSR is:

''The social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time'' (Carrol 1979).

Although this definition is generated 40 years ago, it is yet applicable nowadays due to its flexibility. Despite the definitions range is wide, as a conclusion it can be stated that CSR relates to company's way to consider the people and society beyond legal minimum, while making business (Harjoto & Jo 2010).

There exists no general acceptance whether the CSR and ESG have the same intention and if the CSR is broader perspective than ESG. Stellner, Klein and Zwergel (2015) note that CSR can be viewed how companies incorporate the ESG aspects to their decision making and processes and how they interact with different stakeholders. Throughout this thesis, terms CSR and ESG are used synonymously as the CSR performance is measured with the ESG scores derived from Thomson Reuters. Moreover, some studies have used the term Corporate Social Performance (CSP) to describe the level of firm's CSR, so it means the same as CSR in this thesis.

2.2 The History of CSR

Despite the rapid growth of corporate social responsibility in the last decades, the first essential steps of CSR reach to the early 1950s. After that the content of CSR has changed measurably and thus the understanding of what is responsible or sustainable has varied over time (Carrol 1979; Campbell 2007). The academics have agreed that the modern corporate social responsibility began, when Bowen (1953) published his book ''Social Responsibilities of the Businessman", where he advices corporate managers to respect

the social responsibility while making business-decisions. In the early times, the CSR was focused primarily to the labor right issues (Pedersen 2015: 14).

The expectations about companies' social role in the society leaded to development of ethical activities during the next decades (Clark 2000). As a result of the trend, 75 % of U.S. Fortuna 500 companies incorporated some ethical concept to their business in the 1980s (Ciulla 1991). In addition, Freeman (1984) presented the stakeholder theory, which encouraged firms to satisfy all stakeholders. In the 1990s, companies started to face new challenges after the globalization changed the business environment, but it also opened new opportunities to exploit CSR to gain competitive advantage and boosted the growth of the institutionalization of CSR (Carroll 2015).

During the current millennium, numerous CSR-related voluntary programs and standards are established to improve the execution and reporting of CSR activities. For instance, UN Global Compact (UNGC) is the world largest voluntary sustainable initiative for the multinational organizations that agree to implement their strategies and operations to meet the ten principles of UNGC. Also, the companies involved in UNGC commit to enhance wider sustainability agendas with the support of the UNGC (Voegtlin & Pless 2014). One of these is the Agenda 2030 for Sustainable Development, which is considered as the major global future program to generate more sustainable and responsible world. It is created by all the United Nations Member States in 2015 and includes 17 Sustainable Development Goals (SDG) to improve the peace and wealth in the world by 2030. It aims to implement the coherent global strategy to end the poverty and hungry, while enhancing wealth, education and safety and taking care of environment (Sustainable Development Goals 2015).

One way to perceive the importance of sustainable and responsible trends in business is to look how the magnitude of socially responsible investments has increased during the current millennium. Sustainable, responsible and impact investing (SRI) is an investment strategy that incorporates the ESG criteria into investing process. The SRI can be

approached many ways and various terms such as socially responsible investing, responsible investing and sustainable investing are used to describe the SRI (US SIF 2018). Figure 1 shows the rapid growth of the professionally managed SRI assets in the U.S. The SRI assets have increased roughly sixfold from 2001 to 2018, but the growth has accelerated not until the current decade. The amount of SRI assets was 3.700 billion in 2012, but they surged 78 % in two years to 6.600 billion. Since 2014 the SRI assets increased 32 % to 2016 and 82 % to 2018, when the total amount of SRI assets reached 12.000 billion. It can be concluded that the interest towards sustainable and responsible investments has increased notably over the last years, which makes it important field to search.

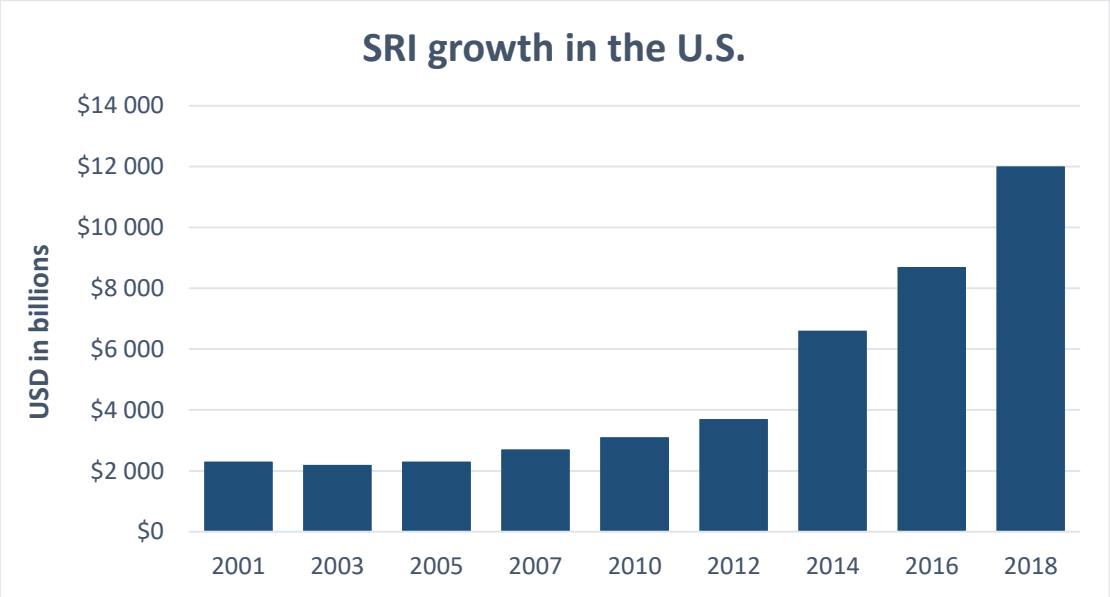

Figure 1. SRI growth in the U.S. 2001–2018 (US SIF Foundation Trends Report 2018).

2.3 CSR theories

The potential benefits and costs of corporate social responsibility can be explained by reviewing different CSR theories. The traditional shareholder theory considers the CSR negatively, while in turn stakeholder and legitimacy theories positively. The overinvestment and agency conflict theories are combined, because of their similar features and

expectations about positive relation between CSR and cost of debt. On the other hand, the risk mitigation theory assumes that CSR has negative impact to the cost of debt.

2.3.1 **Shareholder theory**

Friedman (1962) emphasizes that companies' only purpose is to maximize its profits. According to this shareholder view, companies use their assets inefficiently when they invest to CSR actions instead of other more profitable projects, hurting the interests of shareholders. Friedman (1962) highlights the governments' liability to take care of the other stakeholders' interests, when applying e.g. taxation or regulation. The shareholder theory is usually criticized because of its short-term perspective. Bird, Hall, Momentè and Reggiani (2007) support this critique by finding the CSR-related excess returns only in the long-term period. This might be due because the CSR activities produce usually large expenses in the short-term before the benefits can be realized over time.

2.3.2 **Stakeholder theory**

Freeman (1984) remind that firms cannot focus only to shareholders, instead they need to also consider the other stakeholders e.g. customers, employees, suppliers, debtors and governments. This stakeholder perspective requires firms to meet simultaneously the shareholders financial interests as well as other stakeholders' interests (Pedersen 2015: 207–208). McWilliams and Siegel (2001) note that it is possible to companies to optimize their CSR inputs to respond the interest of all stakeholders while still maximizing the profits. For instance, investments to working conditions, customer and consumer relationships create long-term benefits, which can only add value to business participants without any harm (Pedersen 2015: 208). Nowadays, the firm's relation with the stakeholders is in a key role to success which is why firms are using large amount of money to improve their relations with different stakeholders (Krüger 2015; Bhuiyan &

Nguyen 2019). Moreover, Ge and Liu (2015) note that CSR decreases the information asymmetry and litigation risk and thus benefits the capital market agents.

2.3.3 Overinvestment and agency conflict theory

The overinvestment theory states that CSR leads to the agency-problems between firm management and stakeholders. The managers are enhancing their own reputation by over-investing to the responsibility activities without adding value to the company (Bartkus, Morris & Seifert 2002; Barnea & Rubin 2010). From the perspective of lenders, they are more willing to raise the loan interest of over-invested CSR companies as this kind of inefficient resource use adds risks and makes the companies more vulnerable. The recent studies about bank loan spreads and CSR support the theory by finding that extremely high levels of CSR will increase the loan spread. Banks will punish companies who overinvest to CSR, because it causes unnecessary expenditures without creating extra value. This feature is found only in the private debt market and it is explained to be due of banks' ability to obtain better firm-specific information than other lenders (Bae, Chang & Yi 2018a; Goss & Robert 2011).

2.3.4 Risk mitigation theory

Most of the arguments for the CSR are based on its risk reduction features and the prior studies supports this risk mitigation theory by finding the negative association between the level of CSR and firm risk (e.g. Lee & Faff 2009). Krüger (2015) points out investors' significant negative reaction to negative-CSR cases, while the reaction is only weakly positive to the positive-CSR cases. Although CSR does not necessarily lead to positive returns directly, this result indicate that better CSR is effective way to avoid unwanted events. Jo and Na (2012) investigate controversial firms, which operate in e.g. alcohol, tobacco and gambling industries and discover that CSR engagement significantly reduce the risk of these so-called sin-companies and that the effect of risk reduction is even stronger for

controversial firms than for non-controversial firms. Hence, the benefits of CSR commitment are not limited only to non-controversial firms, but instead CSR is effective way also for sin-companies to reduce risks.

Companies with irresponsible actions and behavior have higher probability to face negative events such as boycotts, unsatisfied employees, fines and government sanctions and legal costs, which might also lead to higher cost of debt (Oikonomou et al. 2014). In order to avoid the negative impacts related to weak CSR, companies have expanded their sustainable strategies into part of risk management (Magnanelli & Izzo 2017).

In the corporate debt market, the risk mitigation view plays the key role in order to explain the possible benefits of acting responsible way. CSR produces a kind of insurance against unexpected risks related to legal, operational and financial activities and therefore lenders consider CSR as one of the default risks factors. Banks and rating agencies appreciate the good CSR performance as it will lower the credit risk (Bae, Chang & Yi 2018a). Ge and Liu (2015) add that CSR benefits firms through more stable future cash flows and better ability to pay the debts because of reduced litigation risk. Some previous papers from both private and public debt markets support the risk mitigation theory by finding negative relationship between CSR and cost of debt (e.g. Oikonomou et al. 2014; Ge & Liu 2015; Bae et al. 2018a).

2.3.5 **Legitimacy theory**

Legitimacy theory is very close to stakeholder theory as it states that companies need to act in way what society expects to be socially acceptable, in order to succeed in business. This is challenging for companies, because the needs and expectations of society varies over time so companies must react to these changes (O'Donovan 2002). According to legitimacy theory, corporation managers disclose CSR-related information when firm's actions are conflicting with the expectations of society in order to mitigate the concerns of community (Gray, Kouhy & Lavers 1995). Lanis and Richardson (2013) find support for

legitimacy theory by reporting positive relationship between company's tax aggressiveness and CSR disclosure. However, even if companies are disclosing more CSR information, they might review only positive aspects of their CSR. Deegan and Rankin (1996) confirm this statement by finding that companies increase their CSR disclosures, when they are prosecuted for environmental violations, but some companies still focus mainly to information, which improves their reputation.

2.4 Corporate debt market

Companies have different private and public sources available to raise funding from the corporate debt market. Private debt is not traded publicly, and the bank loan is the most known type of it. The most common public debt instrument is corporate bond issued by company, which is publicly available for investors who are willing to participate to its financing. Generally, bank loans are short-term debt, while the corporate bonds have usually at least ten-year maturity. However, the loan agreements are made case by case so there are many variations in both private and public debt market. (Berk & DeMarzo 2017: 220-224, 898-903; Brealey, Myers & Allen 2017: 618-639.)

In order to compare the prior results between public and private debt, it is relevant to identify the main differences between these two as they might lead for disparate results. Generally, banks have better ability to collect the specific information about borrowing company, which is not publicly available. Hence, they can use this information when making suitable lending decisions, which improves the information efficiency in the private debt market (Goss & Robert 2011). Several prior studies support this view about banks' ability to get better access to the non-public information than others in the debt market. For instance, Bae et al. (2018b) find that banks will start to increase the loan spread for extremely high CSR companies, because they consider this as an overinvestment. The previous studies from the bond market do not find this feature, which is explained to be due of more limited access to private information related to banks.

Because banks have access to versatile information, it is assumed that they screen the CSR-related information effectively to the loan terms (Goss & Robert 2011). In the public debt market, the information does not move so efficiently as they do not have access to so comprehensive information about the borrower. Nonetheless, Ge and Liu (2015) remark that bondholders are more interested about the all public information, including CSR disclosures, in order to make proper decisions about the issuer. The empirical results of this thesis will later show if the CSR information is valued in the U.S. corporate bond market.

2.5 Corporate bond market

The government's treasury bonds are considered as the most secure bond instruments without risk to default, although there have been seen some exceptions in history when single country cannot handle its obligations. Unlike the treasury bond, the corporate bond includes the risk that the issuer may default so that it is unable to fulfill the promised coupon and principal payments entirely. This credit risk arises the risks of corporate bondholders, because the future cash flows are more unstable. Therefore, the yields are higher for corporate bonds than for treasury bonds. (Berk & DeMarzo 2017: 220-224.)

The difference between the corporate bond yield and the treasury bond yield with comparable maturity is widely used to measure the cost of corporate bond. This difference is so-called yield spread and it is a direct measure of the risk premium that bond issuer company pays to raise funds. The yield spreads control the changes of macroeconomic circumstances, as the treasury bond yields reflects also the macro-level information and therefore yield spreads of different times are comparable. (Ge & Liu 2015.)

The equation one shows how the price of bond is derived (Brealey, Myers & Allen 2017: 25, 47):

$$P_0 = \frac{C}{(1+r)} + \frac{C}{(1+r)^2} + \frac{C}{(1+r)^3} + \cdots + \frac{C}{(1+r)^n} + \frac{PV}{(1+r)^n}, \quad (1)$$

where

P_0 is the current price of the bond

C is the coupon payment

PV is the par value of the bond

r is the discount rate

n is the number of periods.

The discount rate r is the yield of the bond for investor. Usually it is represented as Yield to Maturity (YTM), which is the return for bond hold until the maturity. The YTM sets the present value of all coupon and principal payments equal with current market price of the bond. When the YTM is higher than the coupon rate, the bond is traded at premium and when it is lower, the bond is traded at discount. Bond is traded at par, when these two are equal (Berk & DeMarzo 2017: 207-211). The equation one illustrates the relationship between the price and yield of the bond. When the yield increases, the price of the bond decreases and vice versa.

As mentioned, the corporate bondholders bear the risk that issuer is unable to perform all the promised cash flows and thus they demand higher yields to compensate this credit risk. To finding out the level of credit risk of bonds is extremely difficult for investors. For that reason, there exists rating agencies such as Standard & Poor's (S&P) and Moody's, which rate bonds based on their creditworthiness. Moody's classifies the bond ratings to nine different categories with letters. Aaa, Aa, A and Baa ratings are so-called investment-grade bonds, bearing the lower risk of default, whilst Ba, B, Caa, Ca and C are referred as high-yield or speculative bonds, because they have higher probability to default. Moody's also use numbers 1,2 and 3 at the end of the letters to classify the ratings more specifically. (Berk & DeMarzo 2017: 223-224.)

The credit rating of bond is the most significant factor for bond investors in determining the required rate of return and hence, the dominant factor affecting to the price of the corporate bond. Not only CSR affects directly to the cost of corporate bonds, Oikonomou et al. (2014) reveal that the CSR affects also to the credit rating of corporate bonds. They find that better corporate social performance (CSP) leads to higher credit ratings. Menz (2010) note that because CSR information is already incorporated to credit ratings, it may not be significant factor anymore when determining the cost of corporate bonds. This increases the importance to expand the research in this field as the CSR plays an important role in determining both cost of bonds and credit ratings. The empirical findings will show whether CSR information is already incorporated to the credit ratings or does it still have significant impact to cost of corporate bonds after controlling the credit ratings.

2.5.1 **Green bonds**

As the importance of sustainability and responsibility themes has globally increased, there has been growing interest for various sustainable-related finance instruments. During the last years, new sustainable debt instruments are launched on the debt market and especially green bonds have gained growing interest. Green bonds are similar fixed-income asset-class such as corporate and government bonds, but they are intended to operations that benefit the environment and climate. The green bond-funded projects can relate e.g. reduction of carbon dioxide and pollution, renewable energy, sustainable water or climate change. (Tang & Zhang 2019.)

The figure 2 shows the massive growth of new sustainable debt issuances globally. The green bonds were the only sustainable debt instrument at first, but in the last five years the other instruments have also appeared. However, the most common type of sustainable debt instruments are still green bonds. In 2018, there was new green bond issuances worth of roughly 180 billion dollars, when the amount was only 5 billion dollars in 2012. In 2015, governments of 195 countries signed the Paris Climate Agreement to stop

the climate change and limit the global warming below 2°C (European Commission Paris Agreement 2019). As the governments implied climate policies to support emission reduction, the diverse set of investors and corporations shifted to meet these policies to reduce risks (Reboredo 2018). The figure 2 also highlight the importance of the Paris Climate Agreement as the new sustainable debt issuances shoot up in 2016 and have more than doubled after the agreement.

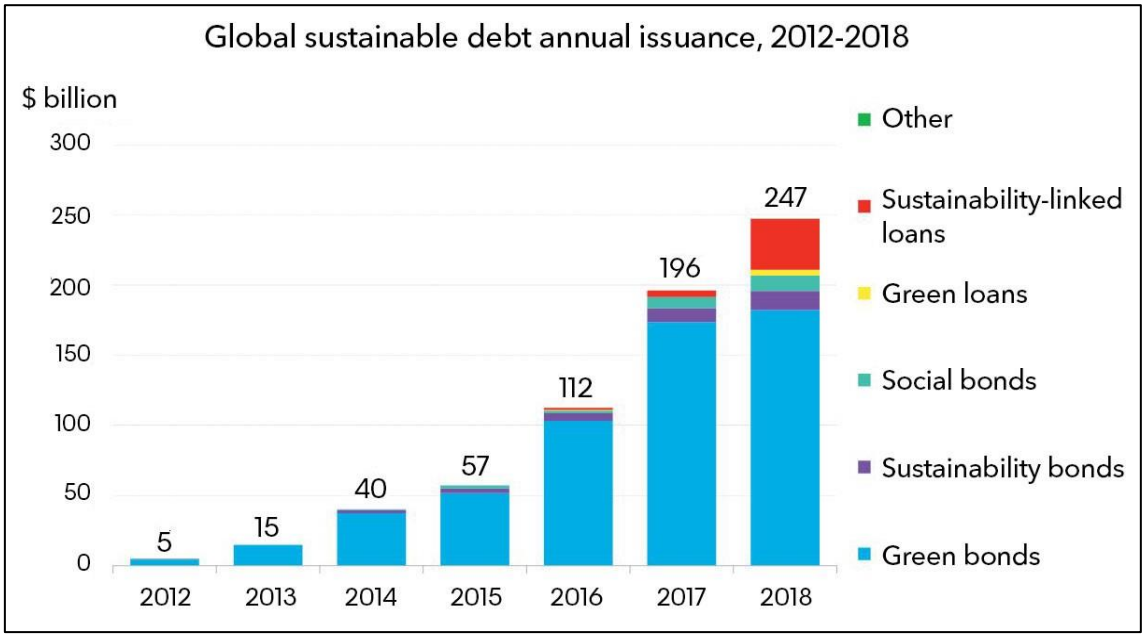

Figure 2. Global sustainable debt issuance 2012–2018 (Bloomberg 2019).

Although this thesis does not consider the green bonds, it is relevant to demonstrate the current trends in the debt market. Because the investors and corporations are more willing to include these sustainability trends to their investments, the level of CSR might be one of the most important factors while selecting the bond instrument nowadays. Hence, it is important to survey how CSR is priced in the corporate bond market.

2.5.2 The magnitude of corporate bond issuances

The figure 2 illustrates the magnitude of the corporate bond market compared to equity market in the U.S. During the 2003–2018, the total worth of new corporate bond issuances was 21.2 billion dollars, while there were new equity issuances merely worth of 4.9 billion dollars. The top of equity issues was in the 2008, but after the financial crisis the number of new issues has remained relatively low level. Instead the corporate debt market has increased rapidly, and new corporate bond issues have approximately doubled within ten last years. The recent emergence of green bonds explains partly this growth, but also general bond issues have increased substantially. The growth of bond issuances is forecasted to rise again in 2019, after the small dip in 2018 (SIFMA 2019).

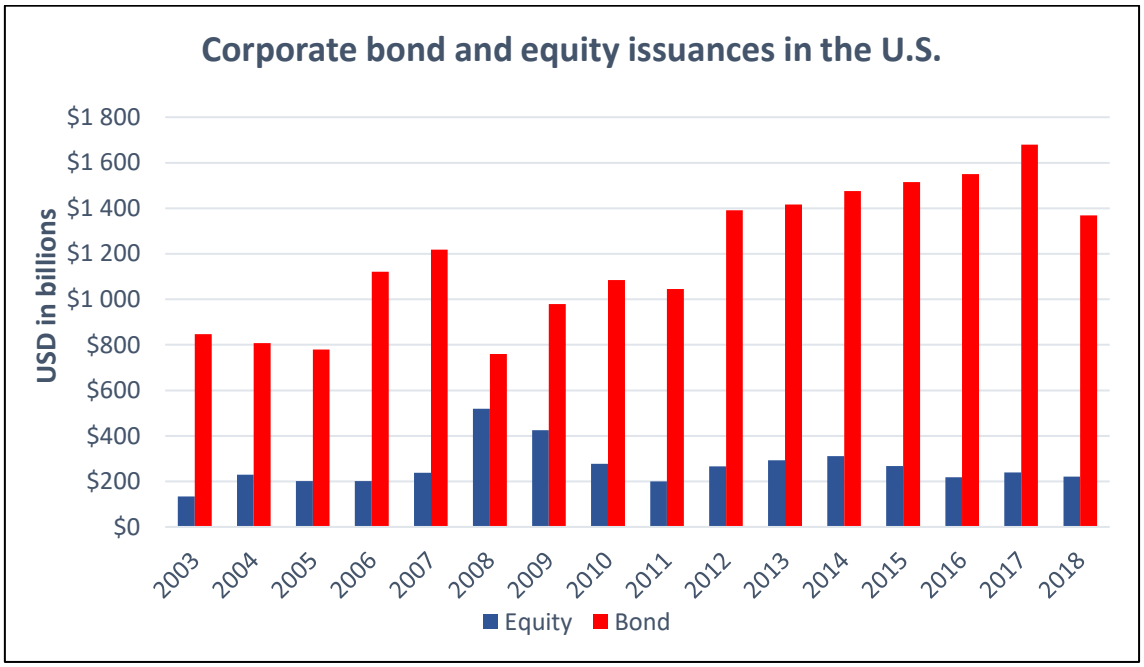

Figure 3. Corporate bond and equity issuances in the U.S 2003–2018 (SIFMA 2019).

Despite the corporate bond market is considerably larger than the equity market, the previous researches have mainly focused to investigate the equity markets. This thesis aims to narrow this gap by searching the corporate bond market of the U.S.

3 Literature review

The importance of CSR has grown rapidly in this decade, which has attracted academics to search its possible linkage to company's financial performance. In the capital market, focus of previous papers has been mainly on how CSR affects to cost of equity (e.g. El Ghoul et al. 2011; Harjoto & Jo 2015), while the evidence from the debt market is scarcer, despite it is considerably larger than the equity market. This chapter presents the previous academic studies exploring the association between CSR and cost of debt. The aim is to bring out the relevant findings and interpret them from CSR theory perspectives.

Previous papers have used three different measures in calculating the cost of debt: financial debt based on accounting -measure interest expenses divided by total debt, interest rate -measure for bank loans and yield spread -measure for corporate bonds. Though the focus of this paper is in the latter, the findings of other cases are presented as well in order to illustrate diversely the matter of CSR to the cost of debt. Previous results of studies, which used the accounting-based and interest rate -measures are presented in sub-chapter 3.1. The academic literature of CSR and cost of corporate bonds are reviewed in sub-chapter 3.2.

3.1 CSR and cost of debt

Goss and Roberts (2011) study the relationship between CSR and cost of bank loans in the U.S. market. Their sample consist of 3.996 loans during 1996–2006 and they find that firms with CSR concerns pay on average 7-18 basis points higher interest rates than more responsible firms. In contrast, they find no evidence that CSR strengths would decrease the interest rate. This phenomenon is explained to be due to banks' risk mitigation as they see CSR concerns as a part of potential default risk, whereas banks process CSR strengths as an overinvestment and therefore firms with advanced CSR activities do not have access to lower interest rates.

Magnanelli and Izzo (2017) search the association between Corporate Social Performance (CSP) and accounting-based cost of debt in global. The sample contains 1.641 observations of 332 firms during the period 2005–2009. The results show that CSR actions are positively and significantly associated with the cost of debt, supporting the overinvestment theory. They conclude that lenders consider CSR activities as a high expense rather than as a risk reduction.

Erragragui (2018) investigates the effect of Environmental and Governance aspects to the accounting-based cost of debt. The sample is composed of 214 firms from the U.S. market between December 2000 and December 2011. The results show that both Environmental and Governance strengths reduce significantly the cost of debt. Nonetheless, only Environmental concerns are associated with higher cost of debt, while the Governance concerns remain without significant influence. This is explained to be due to so-called ‘’governance paradox’’, whereby strengths and concerns of Governance aspect are valued unequally by lenders.

La Rosa et al. (2018) examine how CSP affects to the accounting-based cost of debt in large sample of European listed-companies during 2005–2012. They detect negative association between firm’s level of CSP and the cost of debt, signaling that lenders value CSR actions from the risk mitigation perspective. Furthermore, they inspect if this negative association holds also during the global financial crisis in 2008, but the significance of results vanishes. They state that lenders regard primarily the financial information during crisis time, whereas CSR information lose its importance.

Bae et al. (2018a) investigate the effects of CSR on 5.810 syndicated bank loans in the U.S. market over the period 1991–2008. Their findings suggest negative relationship as CSR strengths decreases the loan rate and CSR concerns increases the loan rate. Furthermore, Bae et al. (2018b) execute another research related to the topic in the same year and study if there exists non-linear relationship between CSR strengths and bank loan spreads. They use the same sample than in their previous study and discover that when

the level of CSR increase, the loan rate falls at declining rate. This indicates non-linear and U-shaped association between CSR strengths and loan spreads. The findings of the studies suggest that banks consider CSR activities as a part of the risk mitigation, but when CSR activities raise above the optimal level, banks begin to see this from an over-investment view and punish companies by increasing the loan rates again.

In addition, Bae et.al. (2018b) investigate the crisis time separately. They include the crisis dummy -variable to the regression for the periods 2000–2002 (tech crisis) and 2008 (global financial crisis). As one can assume, the loan spreads are significantly higher during the crisis time. The results indicate that higher CSR score leads to fall in the loan spreads and the non-linearity effect between CSR strengths and loan spreads stay significant during the crisis periods. Thus, the impact of CSR activities remained similar during crisis time than in normal conditions in the case of bank loans.

3.2 CSR and cost of corporate bonds

Despite the size of corporate bond market, there are only few prior studies searching the impacts of CSR to the cost of corporate bonds in the U.S. Therefore, the evidences from other markets are presented as well, in order to generate broader picture about how CSR is valued in corporate bond market. Also, earlier studies related to CSR and credit ratings are displayed, because the credit ratings already encompass CSR information at some level. Hence, CSR information might no longer have significant impact to yield spreads, after the credit ratings are controlled (Menz 2010).

3.2.1 **Evidence from the U.S. market**

Oikonomou et al. (2014) examine how CSP affects to credit ratings and cost of new corporate bonds. The data sample includes 3.240 bons issued by 742 U.S. companies during the period 1993–2008. They find that good CSP leads to higher credit ratings and vice

versa. Further they search the effect of environmental and social dimensions to bond yield spreads and discover that strengths in Community and Product Safety and Quality significantly decline the yield spread. Respectively, concerns in Community and Employment significantly rise the yield spread. The overall CSP level based on the five individual CSR components indicates significant decrease in yield spreads for firms with CSP strengths and significant increase in yield spreads for firms with CSP concerns. These findings indicate that credit ratings do not totally incorporate CSR-related information, as CSP variables still has extra influence to yield spreads after checking the credit ratings. Furthermore, lenders seem to regard issuer's CSR inputs from the risk mitigation perspective, as better CSP decrease the yield spread and worse CSP raise the yield spread.

Ge and Liu (2015) investigate how CSR performance impacts to credit ratings and yield spreads of new corporate bonds in the U.S. market. Their sample consist of 4.260 new bond issuances during the period 1992–2009. The results show that higher CSR performance leads to better credit ratings implying that CSR information is incorporated to bond ratings at least in part. Thereafter they explore the relationship between CSR performance and yield spreads and find negative relationship as higher CSR performance decreases the yield spread, whereas weaker CSR performance increases the yield spread. These results are consistent with Oikonomou et al. (2014) as they imply that CSR performance has significant impact to yield spreads even after controlling the credit ratings and CSR activities are negatively associated with yield spreads.

More specifically, Ge and Liu (2015) included seven individual CSR aspects to regressions: Environment, Community, Product, Diversity, Employee Relations, Human Rights and Governance. The results reveal that all individual CSR aspects except Human Rights are negatively associated with the yield spread, but the findings are significant only for Community, Product, Employee Relations and Governance -variables. When examining the effect of strengths and concerns of these seven CSR dimensions to yield spreads, all strengths -variables report negative association and all concerns -variables report positive association expect Human Rights. These findings strengthen the risk mitigation

theory of CSR and find no evidence to support the overinvestment theory of CSR as all strengths -variables have negative coefficients.

Hsu and Chen (2015) study whether CSR has impact to the company's financial risk within the period 1991–2012. They use the yield spread of bonds as a one proxy for the financial risk of U.S. based firms and determine the overall CSR performance based on 7 individual CSR components, similarly as Ge and Liu (2015) in their paper. The level of CSR is divided to high-, medium- and low- CSR performance groups and the corresponding mean bond spreads of these groups are 3.62, 4.10 and 4.17 during the whole sample period, suggesting that higher levels of CSR are rewarded with lower yield spreads. Though this is consistent with the previous studies by Oikonomou et al. (2014) and Ge and Liu (2015), there are some limitations in the methodology of this paper. The 3-month Treasury bill rate is used to calculate the yield spread regardless of the maturity of corporate bond and the research methodology is based on the absolute levels of yield spreads without using any regressions or control variables in determining them.

Furthermore, interesting findings occur when Hsu and Chen (2015) analyze the mean yield spreads between the different levels of CSR performance on yearly basis. The high-CSR performance leads to lower yield spreads than low-CSR performance in every year except in 1995 and 2009. The phenomenon is explained to be due to significant rise of yield spreads in 1995, but the other abnormal case occurs simultaneously with the global financial crisis in 2009. This might imply the reverse effect between CSR and yield spreads during the crisis period and thus it is important to extend the research to regard the impact of different macroeconomic cycles.

3.2.2 **Evidence from the other markets**

Menz (2010) study whether the CSR efforts are rewarded in the European corporate bond market. The data includes monthly yield spreads of 498 bonds from the end of July 2004 to the end of August 2007. The results are inverse compared to earlier presented

studies from corporate bond market, suggesting the positive association between CSR and yield spreads, but the finding is significant only in one model. Menz (2010) explains the insignificant impact of CSR to be due to credit ratings, which are more important factor for bond investors in determining the yield spreads than CSR information. Additionally, CSR information is already internalized to credit ratings, so it does not have extra effect to yield spreads separately.

Huang, Hu and Zhu (2018) produce recent evidence about the relationship between overall level of CSR and cost of new corporate bonds in China. After checking the variables availability, 489 bond issuances are left in the period 2011–2015. They discover similar negative linear relationship in China as the previous studies from the U.S. market (Oikonomou et al. 2014; Ge & Liu 2015). Moreover, the results show that government ownership and higher credit rating strengthens the negative relationship between CSR and cost of new corporate bonds in China.

In another study from China, Gong, Xu and Gong (2018) focus to investigate how the quality of CSR information disclosures affects to cost of new corporate bonds. CSR information disclosures are lagged for one year in this study, so the methodology is similar than in previous studies despite the use of term ‘’disclosure’’. The research sample consists of 344 bonds issued from 2010 to 2013. The findings show that companies with better quality of CSR disclosures obtain lower yield spreads than other companies. The effect is stronger for firms with poor corporate governance and if they are operating in regions where the institutional environment is weak. Overall, the studies from China suggest that CSR inputs lead to lower funding costs in Chinese bond market and support the risk mitigation theory of CSR.

3.3 Conclusions from previous studies

As the literature review shows, the results of how CSR affects to the cost of debt are not uniform. The findings vary especially depending on the calculation method but there

exists also differences in results between studies with the same method. Magnanelli and Izzo (2017) find positive, whereas Erragragui (2018) and La Rosa et al. (2018) negative relationship between CSR and cost of accounting-based debt. However, Erragragui (2018) discover that Governance concerns do not significantly increase the cost of debt. Bae et al. (2018a) discover the negative association between CSR and cost of bank loans, while Goss and Roberts (2011) find out that only weak CSR raise the interest rate significantly, but good CSR is not rewarded with lower interest rates. In their another paper, Bae et al. (2018b) uncover that relationship between CSR strengths and cost of bank loans is non-linear, denoting that banks raise interest rates again, when the level of CSR increases to extremely high levels. The negative association between CSR and cost of corporate bonds are reported in U.S. market studies by Oikonomou et al. (2011) and Ge and Liu (2015) and in Chinese market studies by Huang et al (2018) and Gong et al. (2018). In turn, Menz (2010) detect positive relationship in one regression model, whereas the results of other models remain insignificant. He explains this to be due of credit ratings, which already incorporate CSR information and thus it has no additional effect to yield spreads.

The findings from the bank loan market support both the risk mitigation theory as weak CSR firms face higher loan rates and the overinvestment theory as banks are starting to punish supremely high CSR firms. The explanation behind this phenomenon is that bank have better access to firm-specific information than other lenders and for that reason they can make better decision during the lending process. This includes the rise in interest rates when the level of CSR goes above the optimal level (Goss and Roberts 2011). Consistently, the studies from the U.S. corporate bond market find support only to risk mitigation theory of CSR. Nonetheless, the top and bottom quantiles of CSR dimensions are investigated in this study, in order to ensure the risk mitigation theory of CSR.

La Rosa et al. (2018) disclose that negative association between CSR and cost of debt disappears in 2008, but Bae et al. (2018b) observe it to hold also during the crisis period. The feature is not processed in corporate bond market, but Hsu and Chen (2015) show

that absolute levels of yield spreads are higher for high-CSR companies than low-CSR companies in 2009, which might indicate that CSR actions are considered variously during the crisis time. However, this thesis produces more comprehensive evidence how different macroeconomic cycles have impacted to the association between CSR and cost of corporate bonds.

4 Data and Methodology

This chapter presents the data sources of this study, which are used to collect the information about ESG, corporate bonds, financials of S&P 500 companies and U.S. Treasury bond rates. Moreover, the pooled OLS methodology and the regression variables required to search the impact of CSR on the cost of corporate bonds, are introduced.

4.1 Sample data

This paper investigates the association between CSR and cost of new corporate bond issues in the U.S. market. The sample consists of corporate bonds issued by non-financial S&P 500 companies in the period 2003–2018. Banks, financial institutions and insurance companies are excluded as in the previous studies due to their unique regulation environment and different debt financing features (e.g. Ge & Liu 2015; Oikonomou et al. 2014).

The ESG dataset is obtained from the Thomson Reuters Asset4 -database, which is one of the largest and comprehensive ESG information provider. It collects over 7.000 companies' ESG information globally with over 400 ESG-related metrics. These measures are collected by their analysts from annual reports, news sources, company websites and other publicly available sources. The level of companies' environmental, social and governance pillars are scored on the scale from 0 to 100, where the 0 indicates the lowest score and 100 indicates the highest score. The database produces also the economic score, but it is excluded from this research as the focus is in the CSR aspects. However, the overall ESG score computed by database incorporates all the four pillars (Thomson Reuters ESG Refinitiv 2019.) It is used in this thesis to describe the overall level of companies CSR. Because the CSR variables are lagged in this study, the ESG information is started to collect from 2002 continuing until to 2018.

The required financial information of the sample companies is obtained from the Thomson Reuters Worldscope -database. As in the case of CSR information, also the financial information begins from year 2002 as these firm-specific financial variables are lagged in the regression models.

The daily U.S. treasury rates are obtained from the official website of the United States Government. The data of new corporate bond issuances is derived from the Thomson Reuters Datastream, which delivers information about bond yields, amounts, issue and redemption dates, maturities, credit ratings and bond types. The sample consist of 5.547 new U.S. corporate bond issuances during 2003–2018. Convertible and floating-rate bonds are excluded from this research due to their specific features. After matching the bond data with the available ESG information and financial data of S&P 500 companies, there are 751 new bond issuances left. General Electric and Verizon have issued 334 bonds in total during the period, which represents over 44% of the whole sample. Due to their large share of the sample and significantly smaller issue amounts relative to other bonds, these bonds are excluded from this study to avoid biased results. The final sample consists of 417 new corporate bond issuances by non-financial S&P 500 firms.

4.1.1 **Data description**

Table 1 shows the number of new bond issues and the average yield spreads by year and industry. In panel A, the number of issues by year mainly follow the trend of new corporate bonds issues presented in figure 3. Majority of sample bonds are issued between 2015 and 2018, while there is less bond issued in 2003–2014. This can be explained by the recent increase in both bond issuances and importance of responsibility themes as ESG scores have become better available in last years. The average yield spread has varied year by year and the average of whole sample period is 173 basis points. The yield spreads increased during the crisis time and the peak was 255 basis points in 2009, which is in line with the finding of Hsu and Chen (2015). The panel B shows how the sample is distributed by industry level based on the two-digit SIC codes. Public Services, Industrials

and Consumer Discretionary industry companies have issued most bonds, representing 58,5% of the sample. The yield spreads are lowest in Technology and Public Service industries, whereas the yield spreads are largest in Real Estate and Telecommunications industries.

Table 1. Summary of bond issues and yield spreads by year and industry.

Panel A			
Year	Yield spread (bps)	Number of issues	Proportion
2003	153	11	2.6 %
2004	126	2	0.5 %
2005	139	10	2.4 %
2006	126	7	1.7 %
2007	162	11	2.6 %
2008	195	2	0.5 %
2009	255	19	4.6 %
2010	146	20	4.8 %
2011	148	17	4.1 %
2012	179	26	6.2 %
2013	176	22	5.3 %
2014	200	10	2.4 %
2015	176	40	9.6 %
2016	202	53	12.7 %
2017	154	106	25.4 %
2018	178	61	14.6 %
Total	173	417	100 %
Panel B			
Industry	Yield spread (bps)	Number of issues	Proportion
Basic Materials	217	12	2.9 %
Consumer Discretionary	217	68	16.3 %
Consumer Staples	143	47	11.3 %
Energy	184	30	7.2 %
Health Care	217	24	5.8 %
Industrials	146	74	17.7 %
Real Estate	258	9	2.2 %
Technology	139	20	4.8 %
Telecommunications	227	31	7.4 %
Public Services	140	102	24.5 %
Total	173	417	100 %

The figure 4 displays how ESG scores of the sample companies have developed during 2003–2018. All four aspects were in their lowest level in 2003, but they reached the peak immediately in 2004. However, there was only 2 observations in 2004, so one should not emphasize this one-year rapid development. Overall, the scores have fluctuated mainly in the same way over the years and there is no solid growth in scores, although firms have paid attention to ESG actions more and more. Interesting and unexpected finding is that the governance score (brown line) is clearly higher than social (red line) and environmental (green line) scores throughout the period. Usually the environmental and social aspects are considered more valuable than governance aspect and companies have invested more on the actions that improve them, but this might indicate the opposite. It is interesting to see if governance score has the stronger impact to yield spreads than environmental and social scores.

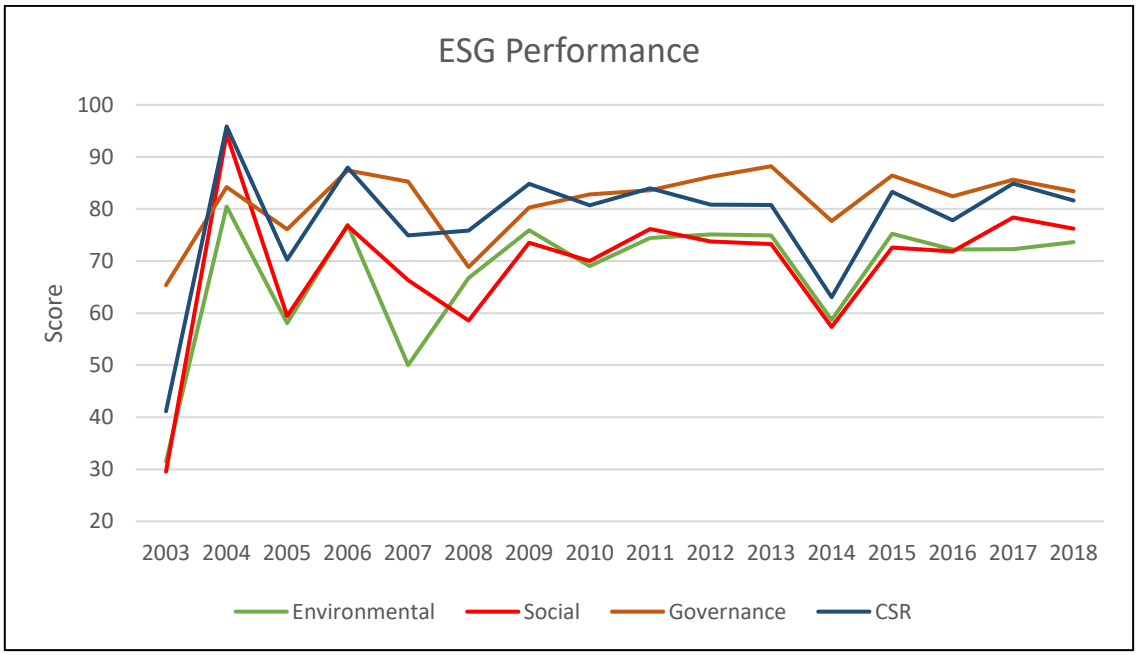

Figure 4. ESG Performance of sample companies 2003–2018.

4.2 Methodology

The relationship between CSR and cost of new corporate bonds is tested by using pooled OLS regression. The required regression variables are presented in subchapters 4.2.1.-4.2.4. All continuous variables are winsorized at bottom and top 1% level to avoid the significant outliers to lead biased results. Further the year and industry indicators are added to regressions to control the year and industry effects (Ge & Liu 2015).

The empirical model to test the first hypothesis is based on the models of previous studies (Oikonomou et al. 2014; Ge & Liu 2015; Huang et al. 2018):

$$Yieldspread_{i,j,t} = \alpha + \beta_1 CSR_{t-1} + \beta_2 Env_{t-1} + \beta_3 Soc_{t-1} + \beta_4 Gov_{t-1} + \beta_5 IssueSize_{i,j,t} + \beta_6 Maturity_{i,j,t} + \beta_7 Rating_{i,j,t} + \beta_9 FirmSize_{i,t-1} + \beta_{10} ROA_{i,t-1} + \beta_{11} Leverage_{i,t-1} + \beta_{12} MTB_{i,t-1} + \beta_{13} IntCov_{i,t-1} + \beta_{14} SalesGrowth_{i,t-1} + Year\ indicators + Industry\ indicators \quad (2)$$

The equation (3) is used to test the second hypothesis, where the top and bottom 25% quantiles of CSR variables are used.

$$Yieldspread_{i,j,t} = \alpha + \beta_1 HighCSR_{t-1} + \beta_2 LowCSR_{t-1} + \beta_3 HighEnv_{t-1} + \beta_4 LowEnv_{t-1} + \beta_5 HighSoc_{t-1} + \beta_6 LowSoc_{t-1} + \beta_7 HighGov_{t-1} + \beta_8 LowGov_{t-1} + \beta_9 IssueSize_{i,j,t} + \beta_{10} Maturity_{i,j,t} + \beta_{11} Rating_{i,j,t} + \beta_{13} FirmSize_{i,t-1} + \beta_{14} ROA_{i,t-1} + \beta_{15} Leverage_{i,t-1} + \beta_{16} MTB_{i,t-1} + \beta_{17} IntCov_{i,t-1} + \beta_{18} SalesGrowth_{i,t-1} + Year\ indicators + Industry\ indicators \quad (3)$$

The equation (2) is used also to test the third hypothesis, but the sample period is divided to three subsample periods: before, during and after the financial crisis. *Pre-Crisis* dummy variable equals to 1 if bond is issued in 2003–2006 and zero otherwise. *Crisis*

dummy variable equals to one if the bonds issued during 2007–2009 and zero otherwise. *Post-Crisis* dummy equals to one if bond is issued 2010–2018 and zero otherwise.

4.2.1 **Dependent variable**

The dependent variable $YieldSpread_{i,j,t}$ is the natural logarithmic of corporate bond yield minus the U.S. Treasury bond yield at issue date with comparable maturity (bond j for company i at time t). The Treasury bonds are generally considered to be risk-free as they are issued by national government, so they bear only smallish credit risk. Therefore, the yield spread controls the U.S. macroeconomic information and indicates directly the risk-premium that the bond issuer company must pay in order to raise funds from the public debt market. (Ge & Liu 2015.) The natural logarithmic is used to correct the positive skewness of the yield spread distribution (Oikonomou et al. 2014).

4.2.2 **CSR test variables**

The main test variables of this paper are the CSR variables based on the overall ESG, environmental, social and governance scores calculated by Thomson Reuters Asset4 -database. The metrics are grouped to three environmental categories: Resource use, Emissions and Innovation; four social categories: Workforce, Human Rights, Community and Product Responsibility; three governance categories: Management, Shareholders and CSR strategy (Thomson Reuters ESG Refinitiv 2019). CSR_{t-1} variable is the overall measure of firm's CSR based on the overall ESG score, Env_{t-1} is the environmental variable, Soc_{t-1} is the social variable and Gov_{t-1} is the governance variable. The variables are lagged, because the prior year-end information is assumed to be the latest publicly available information at the time of bond issuance (Oikonomou et al. 2014; Huang et al. 2018).

The CSR variables mentioned above are turned into percentile ranks in equation (3) as in the prior study of La Rosa et al. (2018), in order to examine the top and bottom 25% quantile scores of CSR variables. The *High* dummy variables equal to one, when the score is in the highest 25% of the sample and zero otherwise. Correspondingly the *Low* dummy variables equal to one, when the score is in the lowest 25% of the sample.

4.2.3 **Bond-specific control variables**

The bond-specific variables size, maturity, credit rating and bond type are included to models to control the different bond features. $IssueSize_{i,j,t}$ is the natural logarithmic of par value of issued corporate bond in US dollars, $Maturity_{i,j,t}$ is the number of months until bond maturity, $Rating_{\ i,j,t}$ is the Moody's credit rating of the bond at the time of issue. The credit ratings are scaled from 0 indicating no rating or default rating to 20 indicating the highest Aaa-rating (Jiraporn, Jiraporn, Boeprasert & Chang 2014).

4.2.4 **Firm-specific control variables**

The relevant financial variables are used to control their impact to the bond yields. As in the case of CSR variables, the financial variables are lagged to ensure that the information was publicly available at the time of bond issuance (Oikonomou et al. 2014; Huang et al. 2018). $Firm\ size_{i,t-1}$ is the natural logarithmic of total assets, $ROA_{i,t-1}$ is the return on total assets, $Leverage_{i,t-1}$ is the total debt divided by total assets, $MTB_{i,t-1}$ is the market to book -ratio, $IntCov_{i,t-1}$ is the interest coverage ratio and $SalesGrowth_{i,t-1}$ is the annual percentage change in sales revenues.

5 Empirical results

The impact of CSR to cost of corporate bonds is empirically tested with various regression models in this chapter. The chapter begins by presenting and analyzing descriptive statistics and correlation matrix of the regression variables. Later, the results of different regression models and sub-samples are reported and interpreted. Table 3 presents the results of the whole sample during 2003-2018 and table 4 reports the results of High and Low 25% quantiles of CSR variables. Finally, the findings of pre-, during and post-crisis periods are displayed in tables 5-7.

5.1 Descriptive statistics and correlation analysis

Table 2. Descriptive statistics.

	Mean	*Median*	*Min.*	*Max.*	*Std. Dev.*	*N*
CSR variables:						
CSR	80.41	90.76	6.85	97.24	22.03	*417*
Environmental	70.93	83.16	9.23	97.21	27.13	*417*
Social	72.79	81.63	8.04	99.04	22.73	*417*
Governance	83.66	88.22	9.66	96.99	14.53	*417*
Bond variables:						
Yield spread (bps)	172.78	141.00	15.00	774.00	110.15	*417*
Ln (Issue size)	13.06	13.12	8.42	15.08	1.04	*417*
Maturity (Months)	198.23	120.00	18.00	1116.00	148.16	*417*
Credit Rating	15.65	16.00	0.00	22.00	4.59	*417*
Firm variables:						
Ln (Firm size)	17.23	17.27	14.83	19.82	1.02	*417*
Leverage (%)	33.33	32.23	10.37	67.68	12.46	*417*
Return on Asset (%)	8.97	7.64	-16.20	32.52	7.62	*417*
Market to Book	1.25	2.48	-239.37	57.90	27.88	*417*
Int. Coverage (%)	9.17	5.34	-8.67	73.19	13.11	*417*
Sales growth (%)	5.07	4.72	-59.96	48.46	16.40	*417*

The sample statistics are summarized in table 2. As mentioned previously the average of governance score is higher than the combined ESG denoted as CSR, environmental and social scores. The average scores of CSR metrics of bond issuer companies are 80.41 for CSR, 70.93 for Environmental, 72.79 for Social and 83.66 for Governance. The yield spread varies from 15 to 774 bps, while the average spread is 173 bps. The average maturity is 198 months and median credit rating is 16, which corresponds to Moody's rating Baa3. The firms' mean leverage is 33.33%, return-on-asset-ratio 8.97%, sales growth 5.07% and market-to book-ratio 1.25.

The correlation coefficients are reported in Appendix 1. As one can assume, all CSR variables are positively and significantly correlated with each other. CSR, environmental and social factors are strongly correlated, while the governance factor is less correlated to these other CSR factors, which can be observed also from the figure 4. To avoid multicollinearity problem, the regressions are executed also with one CSR variable at a time. Otherwise, the correlations between variables are less than 0.60, except correlation between return on assets and interest coverage, so potential multicollinearity is not a problem in this research (Huang et al. 2018).

All CSR variables are significantly and negatively correlated with yield spread, indicating lower spreads for companies with higher CSR level and vice versa. Furthermore, credit rating, firm size, return on asset and interest coverage has significant negative correlation with yield spread, whereas the leverage has significant positive correlation as expected. Credit rating has the strongest negative correlation with the yield spread, which is coherent as it is the major factor in determining the yield of bond.

5.2 CSR and yield spreads of whole sample

Table 3 shows the regression results of how CSR affects to the cost of new corporate bonds issued by S&P 500 firms in 2003–2018. The impacts of overall CSR, Environmental, Social and Governance scores are examined individually in models (1) to (4). All of them have negative and statistically significant coefficients, indicating that better level of CSR and individual aspects of ESG will decrease the yield spread. The findings are statistically significant at 1% level for CSR, Environmental and Social variables and at 5% level for Governance variable. When combining the Environmental, Social and Governance pillars in model (5), the coefficients remain negative, but only Social variable is significant at 5% level.

Because the dependent variable yield spread is log-transformed, the results cannot be interpreted directly. Instead, the percentage change of dependent variable is the exponent of the coefficient minus one, which is multiplied by 100[1]. All other independent variables are assumed to remain constant. (Oikonomou et al. 2014.)

By following this method and assuming all other variables constant, 10 units increase in CSR variable decreases the yield spread by 4.7% on average. Interpreting the results of models (2), (3) and (4), 10 units increase in Environmental, Social and Governance scores lowers the yield spread by 3.1%, 5.0% and 3.8%, respectively. Thus, the Social score has the strongest effect to yield spread, when examining the ESG components separately. This is also supported by the results of model (5), where all three individual ESG components are included to the regression and only Social variable has statistically significant impact at 5% level. According to this model, 10 units increase in Social score leads to 4.5% decrease in yield spread.

[1] $\%\Delta\, Yieldspread = (e^{\beta} - 1) * 100$

Table 3. CSR and yield spreads 2003–2018.

	(1)	(2)	(3)	(4)	(5)
CSR variables:					
CSR	-0.0047***				
	(-3.503)				
Environmental		-0.0031***			-0.0004
		(-2.889)			(-0.264)
Social			-0.0050***		-0.0045**
			(-3.700)		(-2.216)
Governance				-0.0038**	-0.0002
				(-2.318)	(-0.119)
Loan variables:					
Issue Size	-0.0572*	-0.0529*	-0.0587**	-0.0474	-0.0586**
	(-1.925)	(-1.753)	(-1.992)	(-1.595)	(-1.980)
Maturity	0.0012***	0.0012***	0.0012***	0.0012***	0.0012***
	(7.881)	(7.606)	(7.720)	(7.603)	(7.670)
Credit Rating	-0.0378***	-0.0388***	-0.0375***	-0.0389***	-0.0375***
	(-4.388)	(-4.536)	(-4.328)	(-4.538)	(-4.316)
Firm variables:					
Firm Size	-0.0769**	-0.0776**	-0.0740**	-0.1012***	-0.0717*
	(-2.123)	(-2.133)	(-2.050)	(-2.877)	(-1.953)
Leverage (%)	0.0088***	0.0097***	0.0091***	0.0099***	0.0092***
	(3.470)	(3.824)	(3.601)	(3.816)	(3.622)
Return on Asset (%)	-0.0156***	-0.0177***	-0.0161***	-0.0180***	-0.0161***
	(-2.682)	(-3.076)	(-2.791)	(-3.082)	(-2.785)
Market to Book	0.0017**	0.0016**	0.0017**	0.0017**	0.0017**
	(2.245)	(2.135)	(2.212)	(2.223)	(2.183)
Int. Coverage (%)	-0.0071**	-0.0065**	-0.0066**	-0.0068**	-0.0066**
	(-2.532)	(-2.337)	(-2.379)	(-2.338)	(-2.359)
Sales Growth (%)	-0.0003	0.0000	-0.0004	0.0010	-0.0005
	(-0.161)	(0.015)	(-0.226)	(0.601)	(-0.287)
Year indicators	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes
Intercept	7.6499***	7.5083***	7.5488***	7.973***	7.525***
	(10.898)	(10.451)	(10.600)	(11.306)	(10.233)
R^2	0.5103	0.5062	0.5139	0.5026	0.5140
Adjusted R^2	0.4667	0.4623	0.4706	0.4584	0.4680
N	*417*	*417*	*417*	*417*	*417*

This table reports the OLS regression results of the whole sample. The dependent variable is the natural logarithm of yield spread. The independent CSR test variables are overall CSR (Model 1), Environmental (2), Social (3), Governance (4) and combination of ESG factors (5). The heteroskedasticity is corrected with White-Hinkley robust standard errors and t-statistics are presented in parenthesis. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.

The coefficients of loan-specific and firm-specific control variables have the expected signs. Larger issue size, credit rating, firm size, return on assets -ratio and interest coverage decreases the yield spread, whereas longer maturity and higher leverage and market to book -ratio increases the yield spread. All the control variables are statistically significant, except sales growth -variable, which is insignificant on each model. The adjusted R^2 of models varies between 45.8% and 47.1%.

As a conclusion, all the CSR measures have negative and significant impact to the yield spread of corporate bonds, indicating that firms with better level of CSR are rewarded with lower funding cost in the U.S. corporate bond market. Hence, we can accept the first hypothesis that overall CSR and individual pillars of ESG are negatively associated with the cost of corporate bonds. These findings support the risk mitigation theory of CSR and show that lenders value firm's CSR inputs in the corporate bond market. Also, the credit ratings do not seem to incorporate CSR information completely, because CSR variables have significant impact to yield spreads even after controlling the credit ratings.

5.3 Top and bottom quantiles of CSR variables and yield spreads

The regression results for high and low levels of CSR measures and yield spreads are reported in table 4. The CSR measures are transformed into percentile ranks based on the ESG scores. High measure incorporates the observations with the highest 25% ESG scores of the sample and similarly Low measure incorporates observations with the lowest 25% ESG scores of the sample. Reviewing the results of models (1) to (4), all High CSR variables have negative impact to yield spread, but findings are statistically significant only for CSR and Social factors. More specifically, companies with High CSR score have 26% lower yield spread and High Social score have 18% lower yield spread than other companies. When combining the ESG pillars in model (5), only High Social variable have significant impact to yield spread, suggesting 17% lower yield spread relative to others. In turn, Low CSR variables have positive coefficient in all models, suggesting that companies in the bottom 25% quantile of CSR measures are paying higher yield spreads than

Table 4. High and low CSR and yield spreads.

	(1)	(2)	(3)	(4)	(5)
CSR variables:					
High CSR	-0.2638***				
	(-4.044)				
Low CSR	0.0676				
	(0.927)				
High Environmental		-0.0263			0.0452
		(-0.363)			(0.589)
Low Environmental		0.1676**			0.0874
		(2.378)			(1.039)
High Social			-0.1799***		-0.1691**
			(-2.619)		(-2.223)
Low Social			0.0817		0.0170
			(1.223)		(0.226)
High Governance				-0.0963	-0.0680
				(-1.599)	(-1.122)
Low Governance				0.1085	0.0527
				(1.601)	(0.640)
Loan variables:					
Issue Size	-0.0425	-0.0531*	-0.0472	-0.0424	-0.0457
	(-1.419)	(-1.749)	(-1.545)	(-1.402)	(-1.475)
Maturity	0.0011***	0.0012***	0.0011***	0.0012***	0.0012***
	(7.162)	(7.615)	(7.363)	(7.681)	(7.787)
Credit Rating	-0.0371***	-0.0384***	-0.0382***	-0.0393***	-0.0380***
	(-4.214)	(-4.510)	(-4.326)	(-4.543)	(-4.330)
Firm variables:					
Firm Size	-0.0685*	-0.0836**	-0.0953***	-0.0979***	-0.0881**
	(-1.848)	(-2.328)	(-2.718)	(-2.758)	(-2.427)
Leverage (%)	0.0098***	0.0098***	0.0102***	0.0097***	0.0100***
	(3.932)	(3.877)	(4.017)	(3.802)	(4.068)
Return on Asset (%)	-0.0172***	-0.0174***	-0.0181***	-0.0190***	-0.0175***
	(-2.944)	(-2.993)	(-3.199)	(-3.250)	(-3.035)
Market to Book	0.0014*	0.0016**	0.0016**	0.0015**	0.0015*
	(1.856)	(2.069)	(2.101)	(1.990)	(1.946)
Int. Coverage (%)	-0.0048*	-0.0069**	-0.0055*	-0.0068**	-0.0065**
	(-1.689)	(-2.351)	(-1.946)	(-2.388)	(-2.204)
Sales Growth (%)	0.0006	0.0002	0.0004	0.0008	-0.0002
	(0.340)	(0.138)	(0.236)	(0.521)	(-0.123)
Year indicators	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes
Intercept	7.0476***	7.3772***	7.5105***	7.552***	7.3576***
	(8.988)	(10.041)	(10.255)	(10.295)	(9.818)
R^2	0.5232	0.5056	0.5124	0.5065	0.5178
Adjusted R^2	0.4794	0.4602	0.4676	0.4612	0.4679
N	*417*	*417*	*417*	*417*	*417*

This table reports the OLS regression results, where the CSR variables are divided to top and bottom 25% quantiles. The dependent variable is the natural logarithm of yield spread. The independent CSR test variables are overall CSR (Model 1), Environmental (2), Social (3), Governance (4) and combination of ESG factors (5). The heteroskedasticity is corrected with White-Hinkley robust standard errors and t-statistics are presented in parenthesis. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.

others. However, the finding is significant only for Environmental pillar at 5% level, indicating that companies in bottom 25% Environmental score will pay 17% more on yield spread than others.

The loan-specific and firm-specific variables have same signs than in whole sample period results in table 3. Issue size, credit rating, firm size, return on assets -ratio and interest coverage have negative coefficients, whereas maturity, leverage and market to book -ratio have positive coefficients. The adjusted R^2 of models are around 46% as previously.

In summary, the results show that High CSR firms are rewarded as they pay less on their corporate bonds than others and Low CSR firms are penalized as they pay more on their corporate bonds than others. Nonetheless there is lack of statistical significance in some of the results, so we can statistically accept the second hypothesis only for High CSR and High Social factors, which are significant at 1% level and for Low Environmental factor, which is significant at 5% level. These empirical results of top and low quantiles and yield spreads strengthen the view that lenders value CSR inputs in corporate bond market and thus supports the risk mitigation theory of CSR. Neither there are no signs about the overinvestment theory, as all High variables have negative coefficient except Environmental variable in model (5).

5.4 CSR and yield spreads during different market circumstances

The sample is divided into three sub-sample periods in order to search the association between CSR and yield spreads of corporate bonds during different market circumstances and over time. The regression results for pre-crisis period 2003–2006 are reported in table 5, for crisis period 2007–2009 in table 6 and for post-crisis period 2010–2018 in table 7. The loan- and firm-specific control variables are similar than previously, though their coefficients are not reported separately.

5.4.1 CSR and yield spreads before financial crisis

Table 5 shows the empirical findings for before crisis period from 2003 to 2006. All coefficients of CSR variables are positive, indicating that companies with higher CSR level face increased yield spreads when issuing corporate bonds. Particularly, three ESG components seems to increase the yield spreads, whereas the overall CSR has positive but lower impact. The explanation behind the findings might be that CSR actions were seen irrelevant in the beginning of the 2000s and rather as an irresponsible resource use than as a part of risk management, which leads to advanced CSR companies getting penalized with higher yield spreads.

Table 5. CSR and yield spreads 2003–2006.

	(1)	(2)	(3)	(4)	(5)
CSR variables:					
CSR	0.0032				
	(0.1938)				
Environmental		0.0159			0.0167
		(1.319)			(1.222)
Social			0.0126		0.0016
			(0.8803)		(0.094)
Governance				0.0189	0.0214
				(0.851)	(0.755)
Controls:					
Loan-specific	Yes	Yes	Yes	Yes	Yes
Firms-specific	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Intercept	8.1080	10.204**	8.7380*	7.340	10.056*
	('1.441)	(2.516)	(2.223)	(1.554)	(2.408)
R^2	0.6006	0.6883	0.6463	0.6338	0.7384
Adjusted R^2	-0.4479	-0.1299	-0.2822	-0.3275	-0.2645
N	*30*	*30*	*30*	*30*	*30*

This table reports the OLS regression results for pre-crisis period 2003–2006. The dependent variable is the natural logarithm of yield spread. The independent CSR test variables are overall CSR (Model 1), Environmental (2), Social (3), Governance (4) and combination of ESG factors (5). The loan- and firm-specific control variables are similar than in previous models, but they are not presented separately. The heteroskedasticity is corrected with White-Hinkley robust standard errors and t-statistics are presented in parenthesis. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.

However, the sample incorporates only 30 observations, so the sample size sets a limitation to these empirical findings. Also, every finding is insignificant, and the adjusted R-squares are negative, so we cannot draw conclusions about the association of CSR and yield spreads before the financial crisis based on these empirical results.

5.4.2 **CSR and yield spreads during the financial crisis**

The empirical results for the crisis period 2007–2009 are produced in Table 6. The coefficients of models (1) to (4) are negative, suggesting that better CSR dimensions will lower the yield spreads during the crisis time. Nonetheless, the finding is significant only for governance pillar at 10% level, while other findings remain insignificant. Interpreting the results from Model (4), 10 unit increase in Governance score leads to 18.9% decrease in yield spread. Combining three ESG pillars in Model (5), the results indicates negative coefficient for Environmental pillar at 10% level and for Governance pillar at 5% level and positive coefficient for Social pillar, but this finding is not significant. Specifically, 10 units increase in Environmental and Governance scores are assumed to lower the yield spread by 11.1% and 21.4%, respectively.

The findings imply that lenders rewarded companies with better governance performance, whereas the overall CSR and social performance of issuer firms were not seen relevant when determining the cost of corporate bonds during the financial crisis 2007–2009. Sometimes governance actions are not considered so important than environmental and social actions, but the reverse seems to hold in this case. Potential explanation is that lack of trust during the crisis time leads lenders to rely on the better governance firms, because they are regarded as more transparent and thus lower information asymmetry.

The adjusted R-squares of models are quite similar than corresponding R-squares in the whole sample period and they seem to explain the results reasonably well. However, the sample size limits also the crisis-period results as it incorporates only 32 observations,

which also explains why the impact of Environmental and Governance -variables seems to be notably larger than in the case of whole sample. Despite the significant results in Models (4) and (5), this limitation problem is needed to consider, when interpreting these crisis period results. Otherwise, the third hypothesis can be accepted during the crisis period only for Governance pillar at 10% significance level.

Table 6. CSR and yield spreads 2007–2009.

	(1)	(2)	(3)	(4)	(5)
CSR variables:					
CSR	-0.0110				
	(-1.428)				
Environmental		-0.0070			-0.0112*
		(-1.488)			(-2.159)
Social			-0.0000		0.0038
			(-0.0064)		(0.805)
Governance				-0.0191*	-0.0216**
				(-1.835)	(-2.679)
Controls:					
Loan-specific	Yes	Yes	Yes	Yes	Yes
Firms-specific	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Intercept	9.773***	8.588***	11.147**	12.791***	9.093
	('3.211)	(2.283)	(3.214)	(4.281)	(2.485)
R^2	0.7772	0.7758	0.7513	0.8066	0.8529
Adjusted R^2	0.4687	0.4655	0.4069	0.5389	0.5854
N	*32*	*32*	*32*	*32*	*32*

This table reports the OLS regression results for crisis period 2007–2009. The dependent variable is the natural logarithm of yield spread. The independent CSR test variables are overall CSR (Model 1), Environmental (2), Social (3), Governance (4) and combination of ESG factors (5). The loan- and firm-specific control variables are similar than in previous models, but they are not presented separately. The heteroskedasticity is corrected with White-Hinkley robust standard errors and t-statistics are presented in parenthesis. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.

5.4.3 **CSR and yield spreads after the financial crisis**

Table 7 reports the empirical findings for after the financial crisis period 2010–2018. All CSR variables have negative and statistically significant impact to yield spreads in models

(1) to (4). The negative coefficient of CSR, Environmental and Social pillars are significant at 1% level and Governance pillar at 5% level. In model (5), Social pillar has negative and significant coefficient at 1% level, whereas Environmental and Governance performance have positive and insignificant coefficients. Using the same transformation method as presented in sub-chapter 5.2., we can calculate the percentage change in yield spread when CSR variable increases by 10 units. Applying the method to results of models (1) to (4), 10 units increase in CSR score is expected to decrease the yield spread by 5.7% and the corresponding increases in Environmental, Social and Governance scores are expected to lower the yield spread by 3.1%, 6.6% and 4.6%. According to model (5), 10 units increase in Social score is expected to lower the yield spread by 7.9%.

Table 7. CSR and yield spreads 2010–2018.

	(1)	(2)	(3)	(4)	(5)
CSR variables:					
CSR	-0.0057***				
	(-3.927)				
Environmental		-0.0031***			0.0013
		(-2.684)			(0.700)
Social			-0.0066***		-0.0079***
			(-4.650)		(-3.367)
Governance				-0.0046**	0.0003
				(-2.520)	(0.132)
Controls:					
Loan-specific	Yes	Yes	Yes	Yes	Yes
Firms-specific	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Intercept	8.0506***	7.8637***	7.919***	8.370***	7.999***
	(10.560)	(10.052)	(10.307)	(10.956)	(10.062)
R^2	0.5341	0.5257	0.5427	0.5235	0.5436
Adjusted R^2	0.4957	0.4865	0.5050	0.4842	0.5028
N	*355*	*355*	*355*	*355*	*355*

This table reports the OLS regression results for post-crisis period 2010–2018. The dependent variable is the natural logarithm of yield spread. The independent CSR test variables are overall CSR (Model 1), Environmental (2), Social (3), Governance (4) and combination of ESG factors (5). The loan- and firm-specific control variables are similar than in previous models, but they are not presented separately. The heteroskedasticity is corrected with White-Hinkley robust standard errors and t-statistics are presented in parenthesis. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.

The impact of CSR measures to yield spreads is stronger during the post-crisis period compared to the whole sample period results. This is consistent with the recent growth in the importance of sustainability and responsibility themes in business and society. In the corporate bond market this trend is reflected in that companies with better CSR are rewarded with lower cost of corporate bonds. The post-crisis sample is not suffering from the sample size limitation problem, because it consists of 355 observations. It also explains the similarities between the results of whole sample and post-crisis sample periods, as most of the observations are distributed to post-crisis period.

The results suggest that during the post-crisis period from 2010 to 2018, firms with higher CSR metrics obtained lower yield spreads when issuing corporate bonds, which supports the risk mitigation theory of CSR. Lenders seem to value the CSR inputs of bond issuer more and more as the importance of sustainability and responsibility -related trends grows. Hence, we can accept the third hypothesis that CSR measures have negative association with yield spread during the post-crisis period 2010—2018.

6 Conclusions

The purpose of this thesis is to investigate how the level of CSR affect to the cost of new corporate bonds in the U.S. A wide range of sustainability and responsibility practices and themes has raised their awareness in business environment over the last decade. In the U.S., professionally managed SRI assets were $ 3.1 trillion in 2010, but they almost quadrupled to $ 12.0 trillion in 2018 (US SIF 2018). This development enlightens the importance of the topic, which has forced companies to react and improve their CSR. The motivation of this study is that there is no previous evidence how lenders regard issuer's CSR performance in corporate bond market nowadays, even though the U.S. markets are usually extensively studied.

The potential benefits or drawbacks of CSR activities in debt market are linked to funding costs and can be mainly explained by risk mitigation and overinvestment CSR theories. According to risk mitigation theory, better level of CSR reduces firm's risk and therefore leads to decrease in funding costs. Instead, overinvestment theory states that investing to CSR activities is waste of resources and increases firm's risk and thus leads to higher funding costs. Previous studies from the U.S. corporate bond market have found support only for risk mitigation theory (e.g. Oikonomou et al 2014; Ge & Liu 2015), but in the case of bank loans, there are also signs about overinvestment theory (e.g. Bae et al. 2018b).

The research sample contains 417 bond observations issued by non-financial S&P 500 firms during 2003–2018. The overall and individual ESG scores obtained from Thomson Reuters Asset4 -database measure the level of firms' CSR. Pooled OLS methodology with several bond- and firm-specific control variables are used to test the impact of CSR to the cost of corporate bonds. Three research hypotheses are based on the risk mitigation theory of CSR, thus assuming negative association between the level of CSR and cost of corporate bonds. First hypothesis tests the whole sample, second hypothesis tests top and bottom 25% quantiles of CSR variables and third hypothesis tests the effect during three sub-sample periods.

Consistent with previous corporate bond market studies, the empirical results of this thesis show that all CSR test variables have negative and statistically significant impact to yield spreads, supporting the risk mitigation theory. More specifically, the first hypothesis can be statistically accepted for Governance variable at 5% level and for other CSR test variables at 1% level. The strongest impact is reported for Social aspect of ESG, according to which the yield spread decreases by 5% on average, when the score increases 10 units. In addition, combining Environmental, Social and Governance scores in one model, the coefficient is significant only for Social aspect, so our findings suggest that lenders value especially companies' inputs towards social matters.

The impact of highest and lowest 25% quantiles of CSR variables to yield spreads is examined in order to confirm that lenders see bond issuer's CSR activities from the risk mitigation perspective. All High variables have negative and all Low variables have positive coefficients, though findings are significant only for High CSR and High Social scores and Low Environmental scores. Thus, the second hypothesis is statistically accepted for High CSR and High Social variables at 1% level and for Low Environmental variable at 5% level. In general, best firms in CSR and Social categories pay 27% and 18% less on their corporate bonds than others, whereas weak Environmental companies pay 17% higher yield spreads than others. These results show that corporate bond lenders reward companies with good CSR and punish companies with weak CSR and thus the risk mitigation theory of CSR is verified.

Before the financial crisis period results indicate positive coefficients for all CSR variables, but these findings are insignificant. During the crisis time lenders seem to value the Governance aspect of ESG as it has negative and significant impact to yield spreads in two models. However, the sample size limits these findings as there are only 30 and 32 bonds issued in pre- and during crisis period, so not much conclusions cannot be stated based on these results. Instead, most of the bonds are issued during the post-crisis period from 2010 to 2018 and all CSR variables are negatively and significantly associated with yield

spreads. Consequently, the third hypothesis is accepted for Governance variable at 5% level and for other CSR test variables at 1% level in the case of post-crisis period. The impact of CSR is even stronger in the post-crisis period than in the whole sample period, which is in line with the growth in relevance of various sustainability and responsibility issues.

Overall, the findings of this study show that lenders value issuer's CSR performance from the risk mitigation perspective as better CSR companies face lower yield spreads, whereas weaker CSR companies face higher yield spreads at the time of bond issuance. These findings provide practical implications for corporate managers that by improving company's CSR performance, they achieve lower funding costs in the U.S. bond market. In addition, as this thesis focuses to S&P 500 companies, large number of investors benefits from this information while making investment decisions as lower funding costs have influence to financial performance in general.

It is important to extent the research around the topic in future, as both sustainability matters and corporate bond market are continuing their growth. Future research could examine the association by using different measures of CSR, for instance utilize rankings from KLD -database. Also, the study could be expanded by including companies beyond S&P 500 index. This would also help to improve the analysis of different market circumstances, as larger sample would remove the sample size limitation problem and enable better results about how CSR is regarded during different macroeconomic cycles. As the current COVID-19 pandemic has had a great impact to global economy in just over a month, it will be interesting and relevant to regard this in the context of CSR and cost of debt in future. Moreover, new findings from other markets would bring out the potential differences between markets.

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Appendices

Appendix 1. Correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) CSR	1,00													
(2) Env	0,87***	1,00												
(3) Soc	0,92***	0,8***	1,00											
(4) Gov	0,77***	0,6***	0,65***	1,00										
(5) Spread	-0,32***	-0,25***	-0,29***	-0,23***	1,00									
(6) Issue size	-0,08*	-0,08	-0,08	-0,03	-0,01	1,00								
(7) Maturity	0,06	0,04	0,00	0,09*	-0,01	0,01	1,00							
(8) CRating	0,16***	0,11**	0,16***	0,16***	-0,41***	0,07	0,18***	1,00						
(9) Size	0,36***	0,42***	0,36***	0,23***	-0,1**	0,04	0,04	0,06	1,00					
(10) Leverage	-0,03	0,03	0,04	0,07	0,18***	-0,06	-0,17***	-0,18***	-0,09*	1,00				
(11) ROA	0,22***	0,14***	0,18***	0,12**	-0,25***	0,03	0,08	0,2***	-0,19***	-0,02	1,00			
(12) MTB	-0,06	-0,07	-0,08*	-0,07	0,08	0,03	-0,04	-0,07	0,05	-0,17***	-0,12**	1,00		
(13) Int. Cov.	0,12**	0,1**	0,1**	0,07	-0,27***	0,05	0,02	0,25***	-0,08	-0,31***	0,64***	0,00	1,00	
(14) Sales G.	-0,31***	-0,3***	-0,28***	-0,24***	0,12**	-0,07	-0,06	-0,17***	0,06	0,12**	-0,06	0,07	-0,14***	1,00

Table reports the correlation matrix of key regression variables. *, **, and *** indicate statistical significance level at the 10%, 5%, and 1%, respectively.